

CLAIMS

What is claimed is:

1. An *E. coli* strain comprising:
 - a) a disrupted endogenous phosphoenolpyruvate-glucose phosphotransferase system preventing expression of active PEP-glucose phosphotransferase system proteins;
 - b) an up regulated endogenous *galP* gene encoding active galactose-proton symporter;
 - c) an up regulated endogenous *glk* gene encoding active glucokinase; and
 - d) a down regulated endogenous *gapA* gene encoding active glyceraldehyde 3-phosphate dehydrogenase.
2. The *E. coli* strain of Claim 1, wherein the disrupted endogenous phosphoenolpyruvate-glucose phosphotransferase system comprises one or more of :
 - i) disrupted endogenous *ptsH* gene preventing expression of active phosphocarrier protein;
 - ii) disrupted endogenous *ptsI* gene preventing expression of active phosphoenolpyruvate-protein phosphotransferase; and
 - iii) disrupted endogenous *crr* gene preventing expression of active glucose-specific IIA component.
3. The *E. coli* strain of Claims 1 or 2, further comprising one or more of :
 - e) a disrupted endogenous *arcA* gene preventing expression of active aerobic respiration control protein;
 - f) an up regulated endogenous *ppc* gene encoding active phosphoenolpyruvate carboxylase;
 - g) an up regulated endogenous *btuR* gene encoding active cob(I)alamin adenosyltransferase; and
 - h) an up regulated *yqhD* gene encoding active alcohol dehydrogenase.
4. The *E. coli* strain of Claims 1, 2, or 3, further comprising one or more of:
 - i) a disrupted endogenous *mgsA* gene preventing the expression of active methylglyoxal synthase;

- j) a disrupted endogenous *ackA* gene preventing the expression of active acetate kinase;
 - k) a disrupted endogenous *pta* gene preventing the expression of active phosphotrasacetylase;
 - 5 l) a disrupted endogenous *aldA* gene preventing the expression of active aldehyde dehydrogenase A; and
 - m) a disrupted endogenous *aldB* gene preventing the expression of active aldehyde dehydrogenase B.
5. The *E. coli* strain of Claims 1, 2, 3, or 4, further comprising one
10 or more of:
- n) a disrupted endogenous *edd* gene preventing expression of active phosphogluconate dehydratase;
 - o) a disrupted endogenous *glpK* gene preventing expression of active glycerol kinase; and
 - 15 p) a disrupted endogenous *gldA* gene preventing expression of active NADH-dependent glycerol dehydrogenase.
6. A method for the bioproduction of 1,3-propanediol comprising contacting the *E. coli* strain of Claims 1, 2, 3, 4 or 5 with a suitable carbon substrate under suitable conditions.
- 20 7. The method of Claim 6, wherein the *E. coli* strain further comprises:
- (i) glycerol-3-phosphate dehydrogenase;
 - (ii) glycerol-3-phosphatase;
 - (iii) dehydratase; and
 - 25 (iv) dehydratase reactivation factor.
8. An *E. coli* strain comprising
- a) a disrupted endogenous phosphoenolpyruvate-glucose phosphotransferase system preventing expression of active PEP-glucose phosphotransferase system proteins;
 - 30 b) an up regulated endogenous *galP* gene encoding active galactose-proton symporter;
 - c) an up regulated endogenous *glk* gene encoding active glucokinase;
 - d) a down regulated endogenous *gapA* gene encoding active
35 glyceraldehyde 3-phosphate dehydrogenase.

- e) a disrupted endogenous *arcA* gene preventing expression of active aerobic respiration control protein;
- f) an up regulated endogenous *ppc* gene encoding active phosphoenolpyruvate carboxylase;
- 5 g) an up regulated endogenous *btuR* gene encoding active cob(I)alamin adenosyltransferase;
- h) an up regulated *yqhD* gene encoding active alcohol dehydrogenase.
- i) a disrupted endogenous *mgsA* gene preventing the expression of active methylglyoxal synthase;
- 10 j) a disrupted endogenous *ackA* gene preventing the expression of active acetate kinase;
- k) a disrupted endogenous *pta* gene preventing the expression of active phosphotrasacetylase;
- 15 l) a disrupted endogenous *aldA* gene preventing the expression of active aldehyde dehydrogenase A;
- m) a disrupted endogenous *aldB* gene preventing the expression of active aldehyde dehydrogenase B.
- n) a disrupted endogenous *edd* gene preventing expression of active phosphogluconate dehydratase;
- 20 o) a disrupted endogenous *glpK* gene preventing expression of active glycerol kinase;
- p) a disrupted endogenous *gldA* gene preventing expression of active NADH-dependent glycerol dehydrogenase; and
- 25 q) any one of the nucleotide sequences for a pSYCO construct SEQ ID NOs:65, 66, 67, or 68.